

#2/6/26/01  
Patent *Qade*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: David J. Norris

Serial No.: Not Yet Assigned

Group Art Unit: Not Yet Assigned

Filed: Herewith

Examiner: Not Yet Assigned

• For: METHOD FOR MANUFACTURING HIGH-QUALITY  
MANGANESE-DOPED SEMICONDUCTOR  
NANOCRYSTALS

Date: March 19, 2001



FILING OF INFORMATION DISCLOSURE STATEMENT  
UNDER 37 C.F.R. 1.97-1.98

ASSISTANT COMMISSIONER FOR PATENTS  
WASHINGTON, D.C. 20231

Dear Sir:

Pursuant to the duty of disclosure of information material to the patentability of claims in the above-captioned patent application under 37 C.F.R. 1.56, submitted herewith is a completed Form PTO-1449 and a copy of each reference cited therein.

Authorization is hereby given to charge any fees which may be required, except the issue fee, to Deposit Account 14-0627.

Respectfully submitted,

A handwritten signature in black ink, appearing to be "AG Isztwan".

Andrew G. Isztwan, Esq.  
Reg. No. 40,028  
(609) 951-2533

EXAMINER INITIAL		DOCUMENT NUMBER							DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA	5	2	6	0	9	5	7	Nov. 9, 1993	Hakimi et al.			
	AB	5	9	9	0	4	7	9	Nov. 23, 1999	Weiss et al.			
	AC	6	0	4	8	6	1	6	Apr. 11, 2000	Gallagher et al.			

[illegible]

AD	Alivisatos, A.P., "Semiconductor Clusters, Nanocrystals, and Quantum Dots," <i>Science</i> , Vol. 271, pp. 933-937, February 16, 1996
AE	Efros, A.I. et al., "Interband Absorption of Light in a Semiconductor Sphere," <i>Sov. Phys. Semicond.</i> , Vol. 16, No. 7, pp. 772-775, July 1982
AF	Ekimov, A.I. et al., "Quantum Size Effect in the Optical Spectra of Semiconductor Microcrystals," <i>Sov. Phys. Semicond.</i> , Vol. 16, No. 7, pp. 775-778, July 1982
AG	Brus, L.E., "A Simple Model For the Ionization Potential, Electron Affinity, and Aqueous Redox Potentials of Small Semiconductor Crystallites," <i>J. Chem. Phys.</i> , Vol. 79, No. 11, pp. 5566-5571, December 1, 1983
AH	Murray, C.B. et al., "Synthesis and Characterization of Nearly Monodisperse CdE (E = S, Se, Te) Semiconductor Nanocrystallites," <i>American Chemical Society</i> , pp. 8706-8715, 1993
AI	Norris, D.J. et al., "Measurement and Assignment of the Size-Dependent Optical Spectrum in CdSe Quantum Dots," <i>Physical Review B</i> , Vol. 53, No. 24, pp. 16338-16346, June 15, 1996-II
AJ	Murray, C.B. et al., "Self-Organization of CdSe Nanocrystallites into Three-Dimensionally Quantum Dot Superlattices," <i>Science</i> , Vol. 270, pp. 1335-1338, November 24, 1995
AK	Colvin, V.L. et al., "Light-Emitting Diodes Made From Cadmium Selenide Nanocrystals and a Semiconducting Polymer," <i>Nature</i> , Vol. 370, pp. 354-357, August 4, 1994
AL	Vlasov, Y.I. et al., "Synthesis of Photonic Crystals for Optical Wavelengths from Semiconductor Quantum Dots," <i>Advanced Materials</i> , Vol. 11, No. 2, pp. 165-169, 1999
AM	Wang, Y. et al., "Three-Dimensionally Confined Diluted Magnetic Semiconductor Clusters - Zn <sub>1-x</sub> Mn <sub>x</sub> S," <i>Solid State Communications</i> , Vol. 77, No. 1, pp. 33-38, 1991

DATE CONSIDERED

**EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 (Modified)				ATTY. DOCKET NO. NEC11085		SERIAL NO. Not Yet Assigned	
<b>LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT</b>  (Use several sheets if necessary)				APPLICANT David J. Norris			
				FILING DATE Herewith		GROUP Not Yet Assigned	

  

REFERENCE DESIGNATION								U.S. PATENT DOCUMENTS			
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE				

  

FOREIGN PATENT DOCUMENTS								
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO

  

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
AN	Bhargava, R.N. et al., "Optical Properties of Manganese-Doped Nanocrystals of ZnS (etc.)," <i>Physical Review Letters</i> , Vol. 72, No. 3, pp. 416-419, January 17, 1994	
AO	Oka, Y et al., "Excitonic Properties of Nanostructure Semimagnetic Semiconductors," <i>Journal of Luminescence</i> , Vol. 70, pp. 35-47, 1996	
AP	Sooklal, K. et al., "Photophysical Properties of ZnS Nanoclusters with Spatially Localized Mn <sup>2+</sup> ," <i>J. Phys. Chem.</i> , No. 100, pp. 4551-4555, 1996	
AQ	Levy, L. et al., "Control of the Size and Composition of Three Dimensionally Diluted Magnetic Semiconductor Clusters," <i>J. Phys. Chem.</i> , Vol. 100, pp. 18322-18326, 1996	
AR	Levy, L. et al., "Three Dimensionally Diluted Magnetic Semiconductor Clusters Cd <sub>1-x</sub> Mn <sub>x</sub> S With a Range of Sizes and Compositions: Dependence of Spectroscopic Properties on the Synthesis Mode," <i>J. Phys. Chem. B</i> , pp. 9153-9160, 1997	
AS	Feltin, N. et al., "Unusual Static and Dynamic Magnetic Properties of Cd <sub>1-x</sub> Mn <sub>x</sub> S Nanocrystals," <i>Journal of Applied Physics</i> , Vol. 87, No. 3, pp. 1415-1423, February 1, 2000	
AT	Counio, G et al., "CdS:Mn Nanocrystals in Transparent Xerogel Matrices: Synthesis and Luminescence Properties," <i>J. Phys. Chem.</i> , Vol. 100, pp. 20021-20026, 1996	
AU	Counio, G. et al., "Synthesis and Photoluminescence of Cd <sub>1-x</sub> Mn <sub>x</sub> S (x ≤ 5%) Nanocrystals," <i>J. Phys. Chem. B</i> , Vol. 102, pp. 5257-5260, 1998	
AV	Mikulec, F.V. et al., "Organometallic Synthesis and Spectroscopic Characterization of Manganese-Doped CdSe Nanocrystals," <i>J. Am. Chem. Soc.</i> , Vol. 122, pp. 2532-2540, 2000	
AW	Hoffman, D.M. et al., "Giant Internal Magnetic Fields in Mn Doped Nanocrystal Quantum Dots," <i>Solid State Communications</i> , Vol. 114, pp. 547-550, 2000	

  

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		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION
							YES   NO

  

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
AX	Furdyna, J.K., "Diluted Magnetic Semiconductors," <i>J. Appl. Phys.</i> , Vol. 64, No. 4, pp. R29-R64, August 15, 1998	
AY	Gupta, J.A. et al., "Spin Coherence in Semiconductor Quantum Dots," <i>Physical Review B</i> , Vol. 59, No. 16, pp. R10421-R10424, April 15, 1999	
AZ	Ando, K. et al., "Magneto-Optical Study of Quantum Confinement in Cd(S,Se) Quantum Dots," <i>Physical Review B</i> , Vol. 47, No. 20, pp. 13462-13465, May 15, 1993	
BA	Awschalom, D.D. et al., "Electron Spin and Optical Coherence in Semiconductors," <i>Physics Today</i> , Vol. 52, pp. 33-38, June 1999	
BB	Ladizhansky, V. et al., "Surface Properties of Precipitated CdS Nanoparticles Studied by NMR," <i>J. Phys. Chem. B.</i> , No. 102, pp. 8505-8509, 1998	
BC	Hines, M.A. et al., "Bright UV-Blue Luminescent Colloidal ZnSe Nanocrystals," <i>The Journal of Physical Chemistry B</i> , Vol. 102, No. 19, pp. 3655-3657, May 7, 1998	
BD	Gallagher, D. et al., "Homogeneous Precipitation of Doped Zinc Sulfide Nanocrystals for Photonic Applications," <i>J. Mater. Res.</i> , Vol. 10, No. 4, pp. 870-876, April 1995	
BE	Tamura, M. et al., "Elimination and Catalytic Decomposition of Dialkylmanganese Species," <i>J. Organometal. Chem.</i> , Vol. 29, pp. 111-129, 1971	
BF	Oczkiewicz, B. et al., "Intra-Manganese Absorption and Luminescence in Zn, Mn, Se Semimagnetic Semiconductor," <i>Solid State Communications</i> , Vol. 64, No. 1, pp. 107-111, 1987	
BG	Xue, J. et al., "Temperature Evolution of the 2.1 eV band in the Zn <sub>1-x</sub> Mn <sub>x</sub> Se System for Low Concentration," <i>Journal of Luminescence</i> , Vol. 78, pp. 173-178, 1998	

  

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